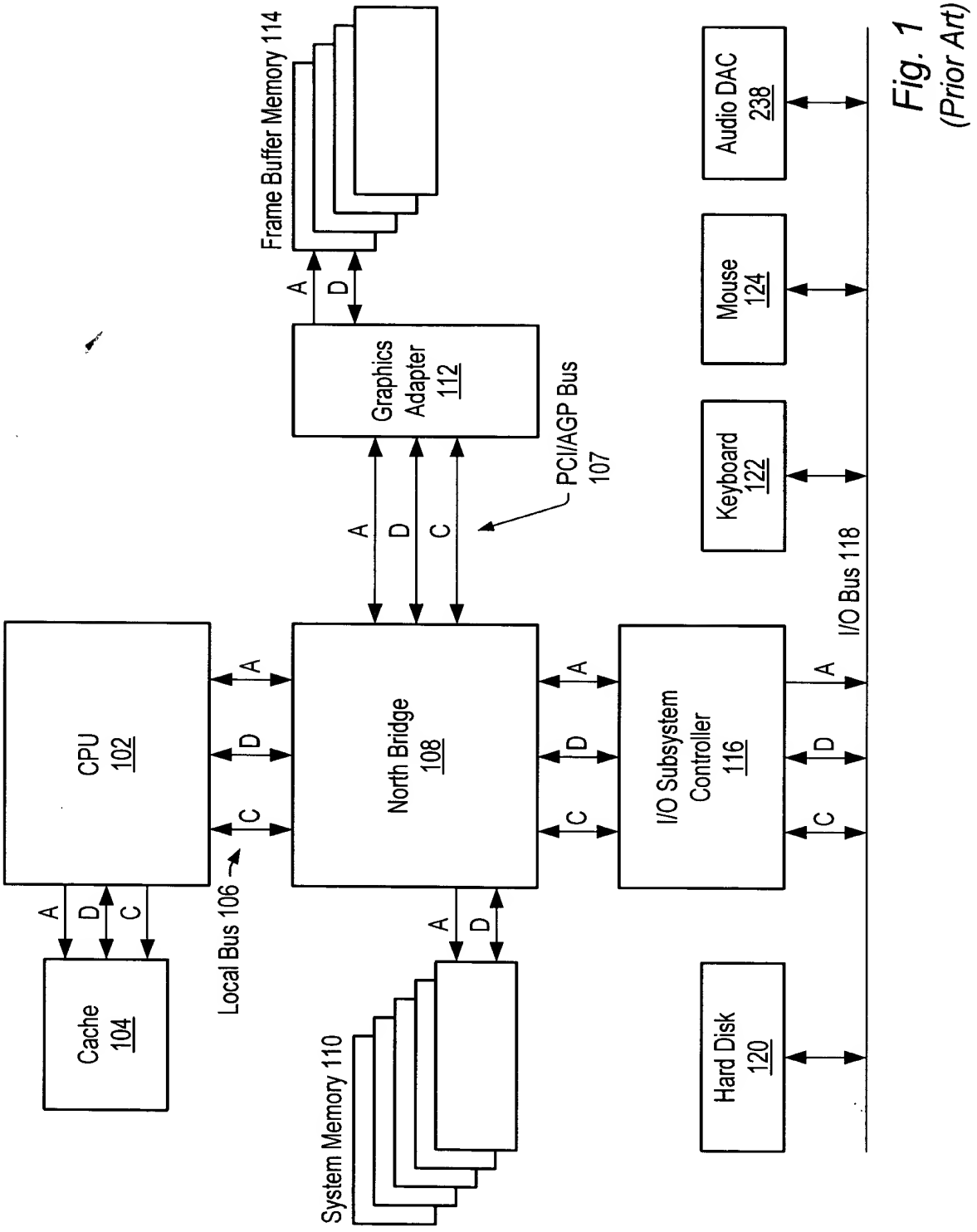


Fig. 1
(Prior Art)

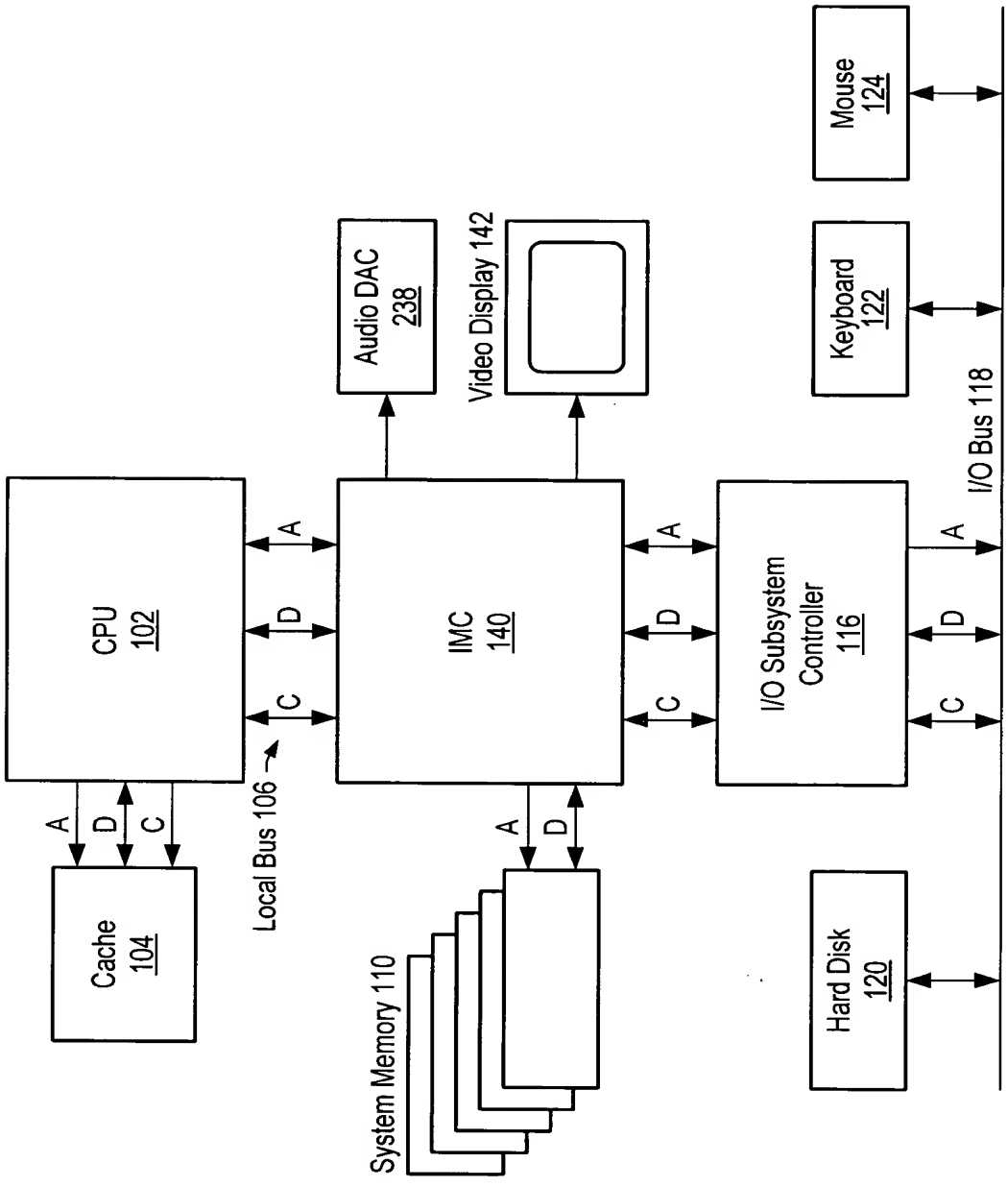


Fig. 2

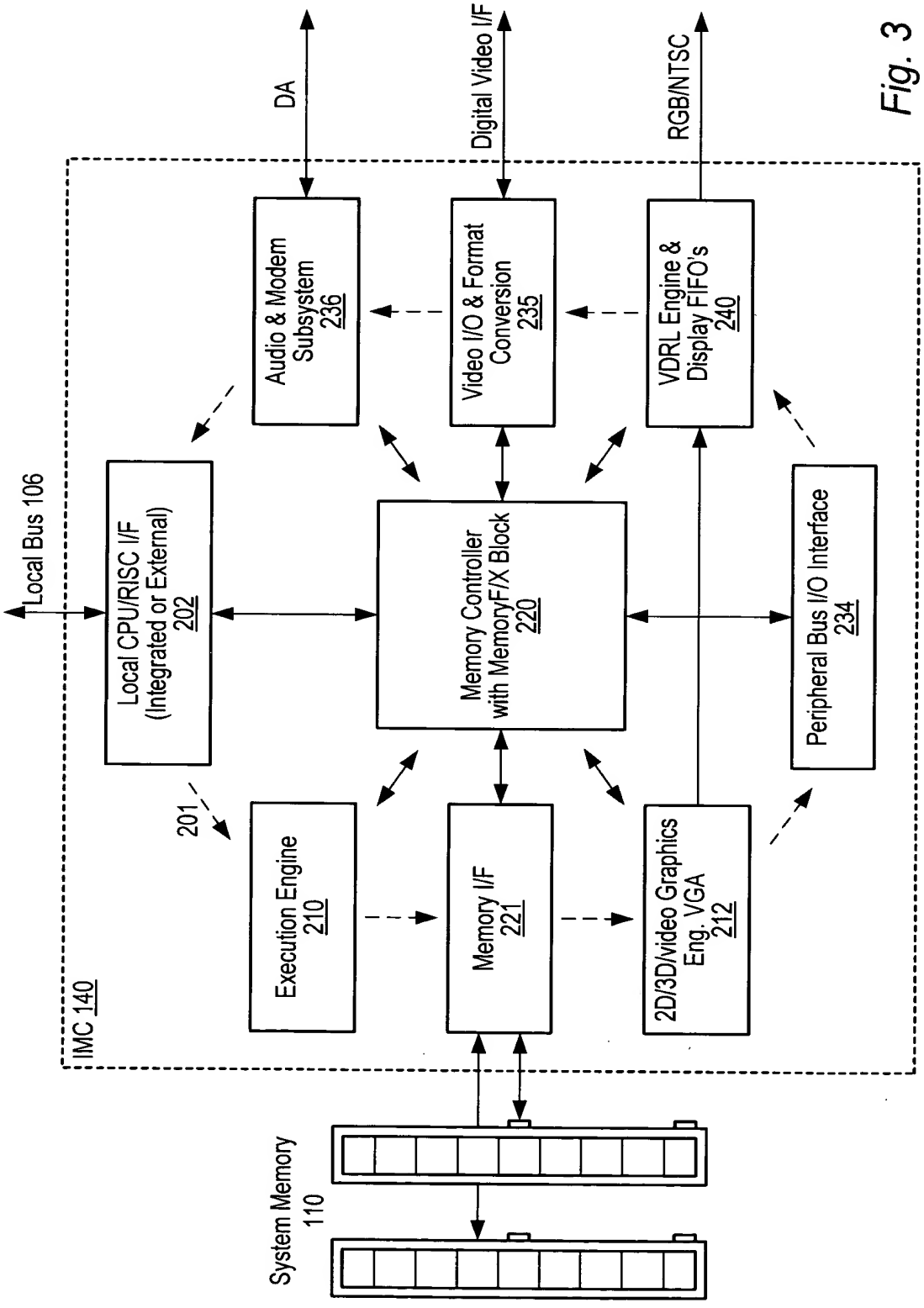


Fig. 3

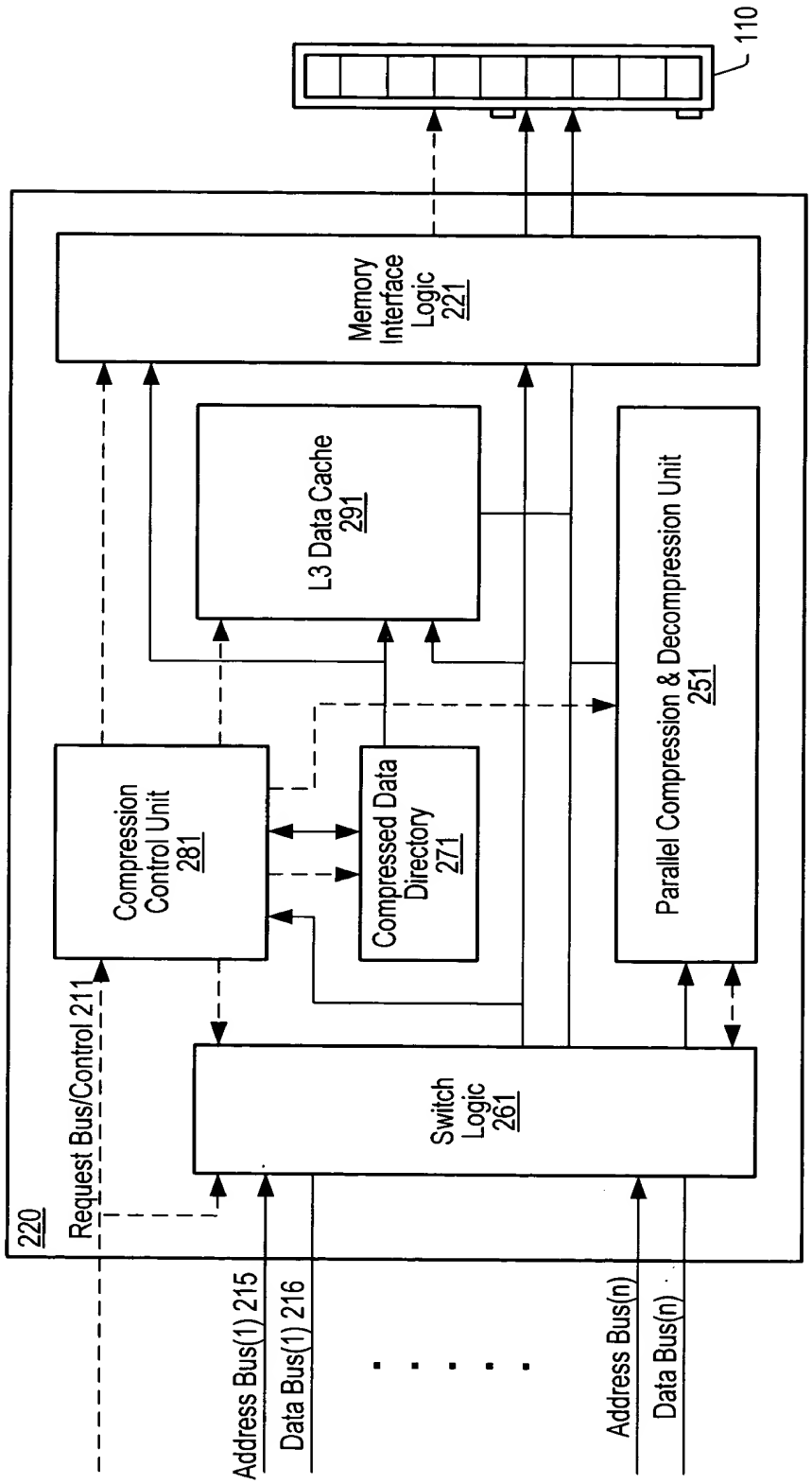


Fig. 4

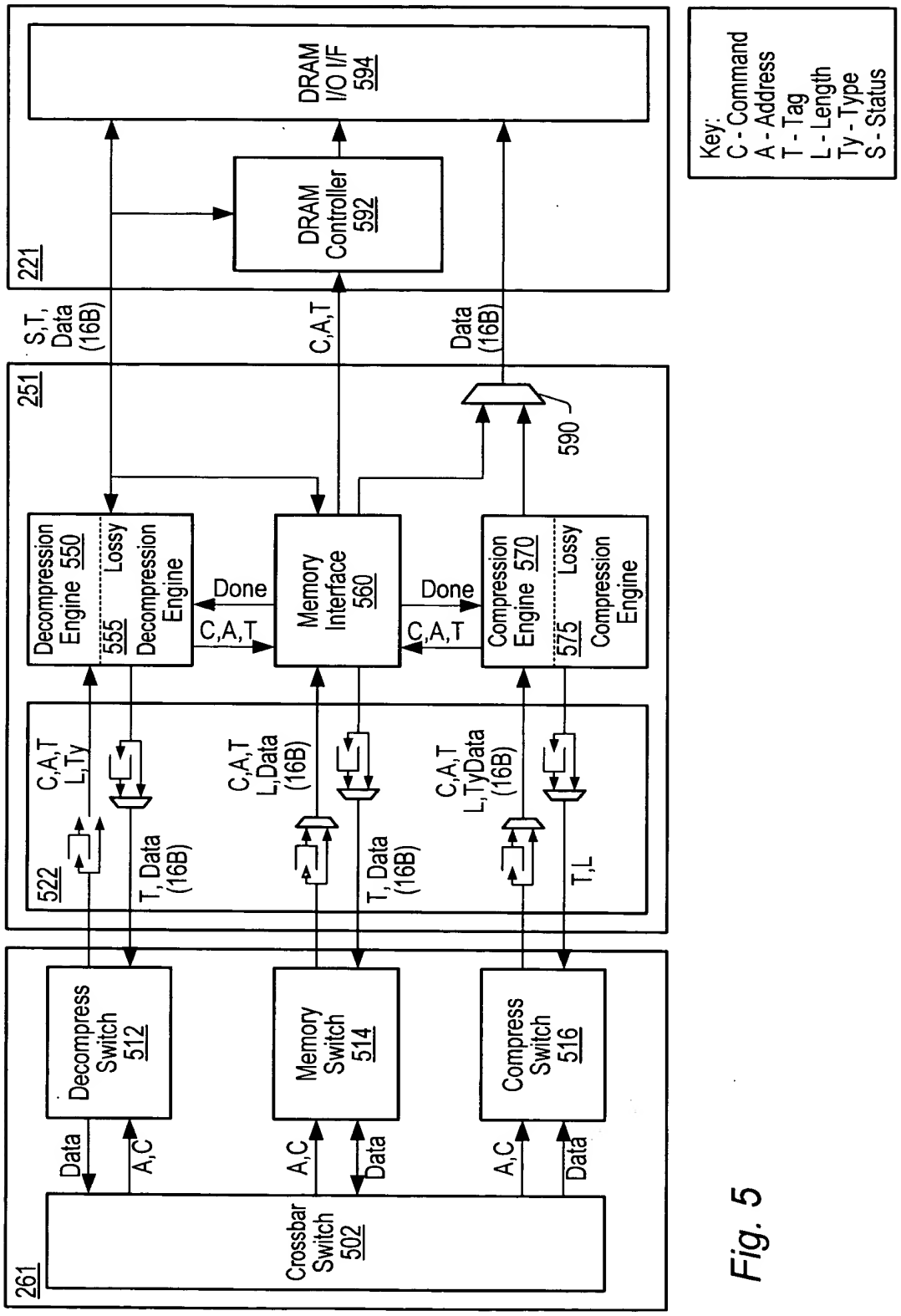


Fig. 5

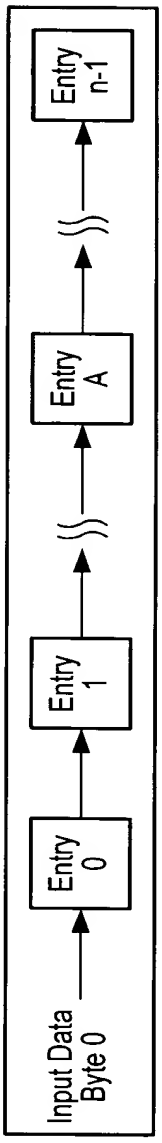


Fig. 6A
(Prior Art)

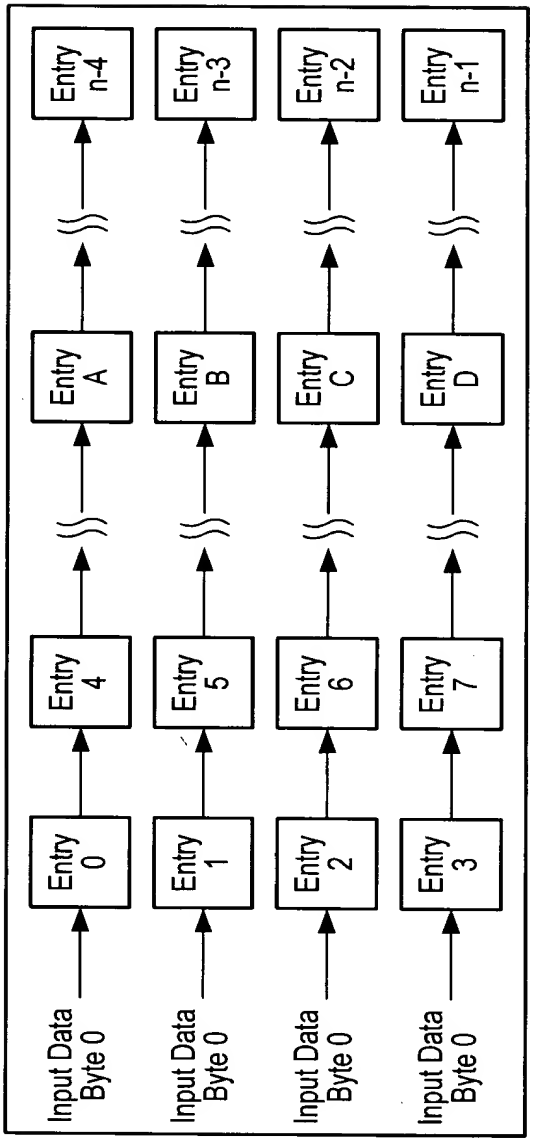


Fig. 6B
(New Art)

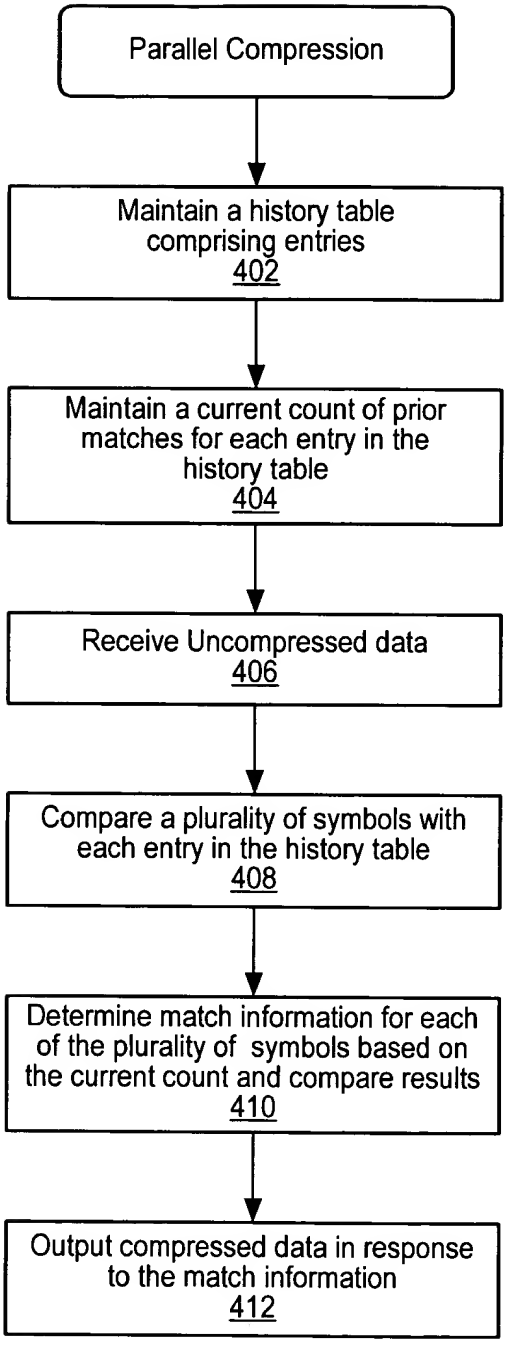


Fig. 7

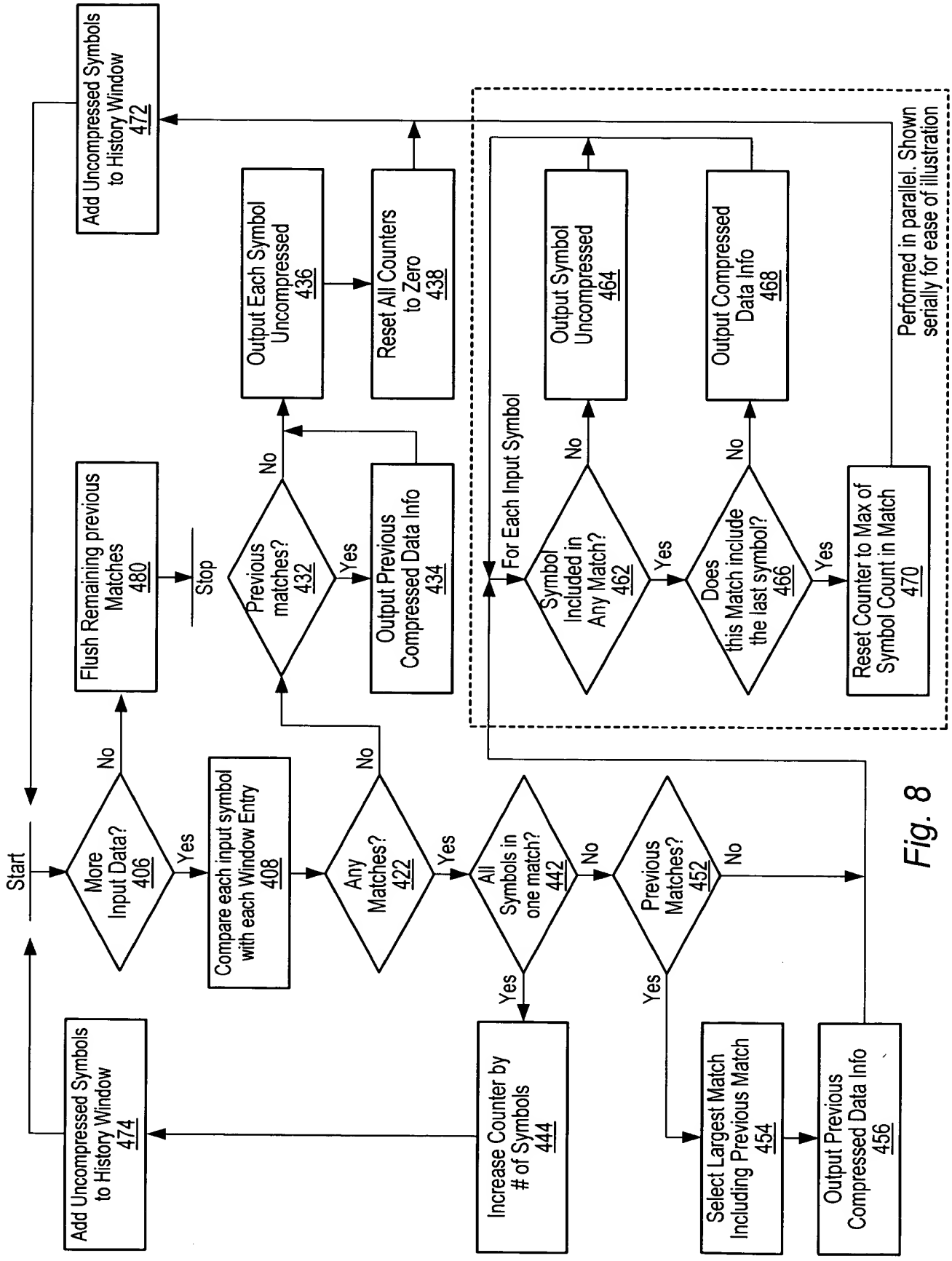


Fig. 8

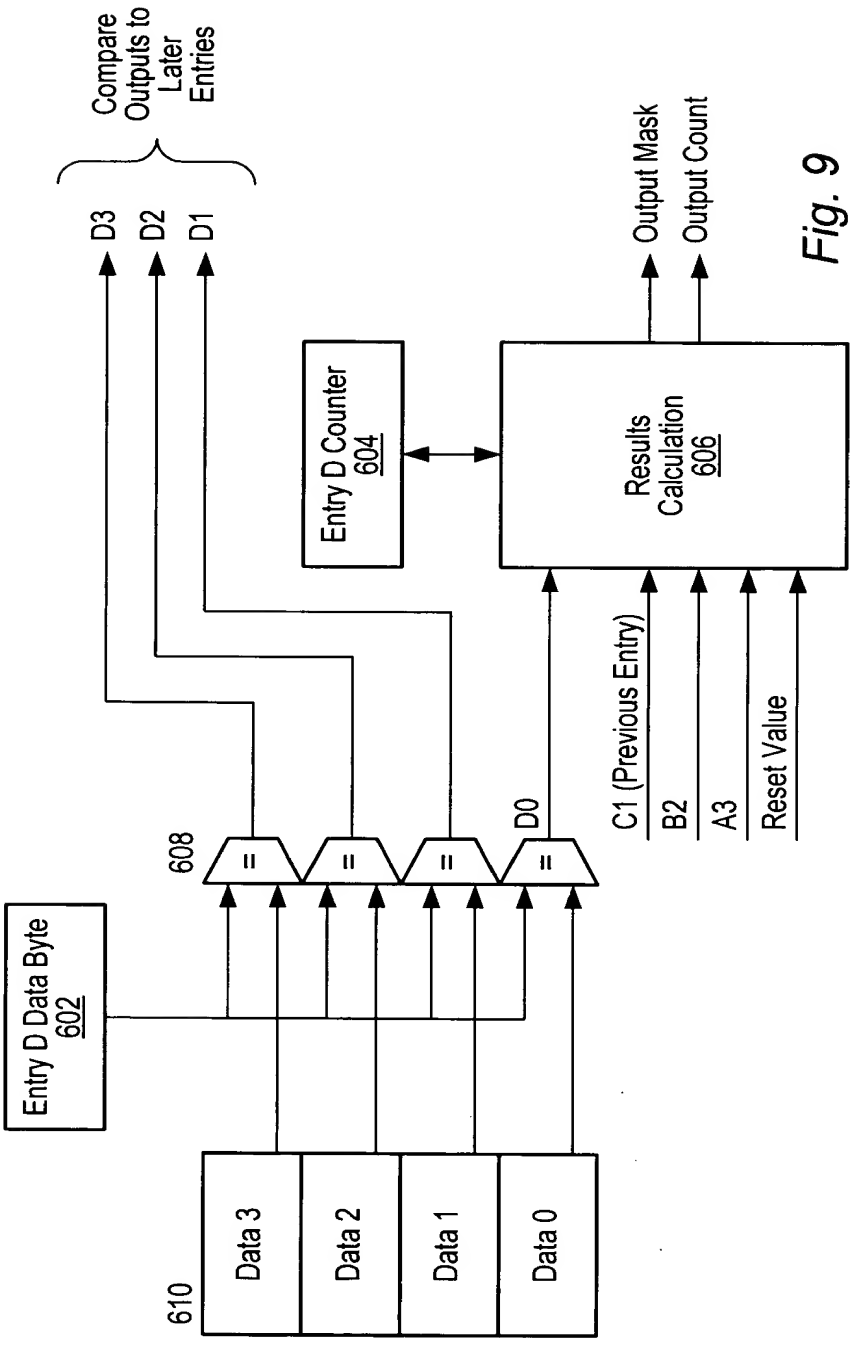


Fig. 9

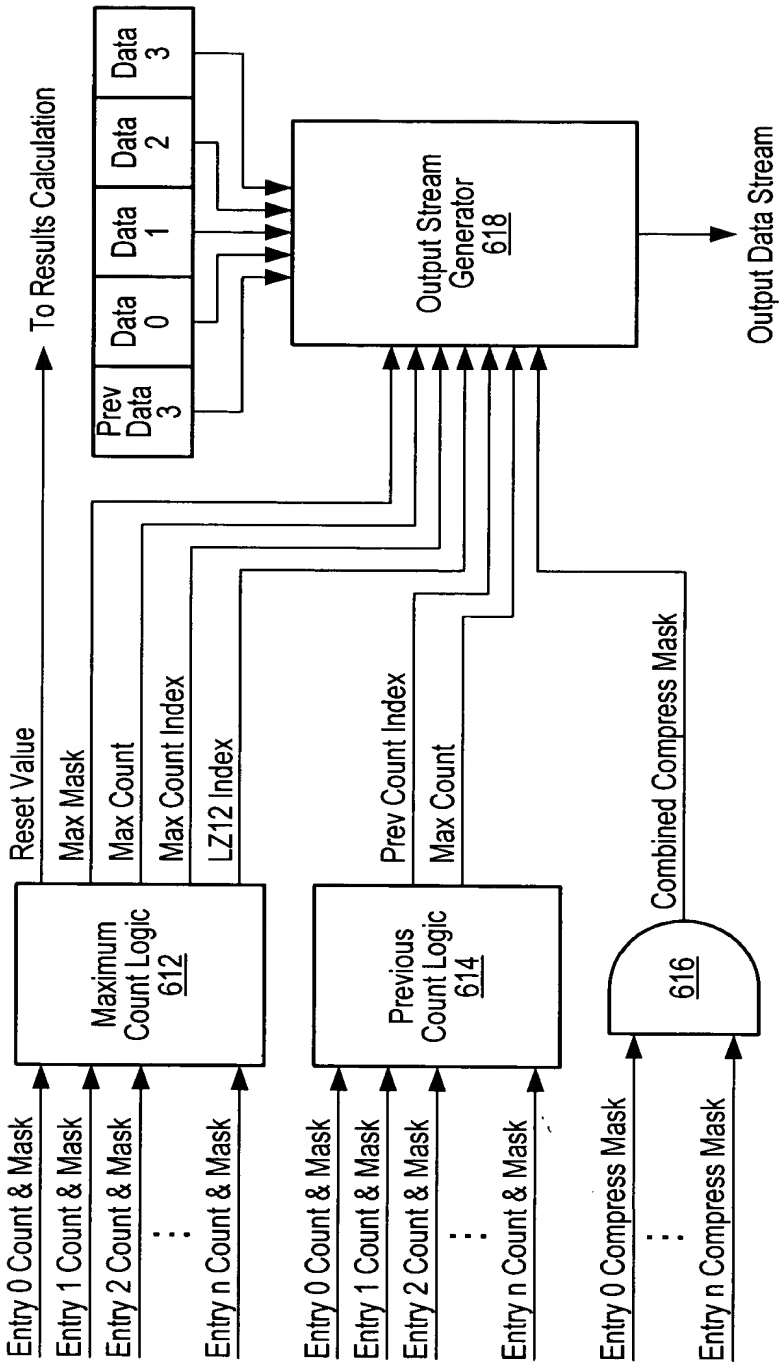


Fig. 10

Input Matches				New Counter Value	Output Counter	Output Mask	Reset Value
D0	C1	B2	A3				
1	1	1	1	Saved+4	Saved +4	10000	0
1	1	1	0	0	Saved+3	10001	1
1	1	0	1	1	Saved+2	10010	2
1	1	0	0	0	Saved+2	10011	2
1	0	1	1	2	Saved+1	10100	3
1	0	1	0	0	Saved+1	10101	3
1	0	0	1	1	Saved+1	10110	3
1	0	0	0	0	Saved+1	10111	3
0	1	1	1	3	Saved	11000	4
0	1	1	0	0	Saved	01111	1
0	1	0	1	1	Saved	11010	4
0	1	0	0	0	Saved	11011	4
0	0	1	1	2	Saved	11100	4
0	0	1	0	0	Saved	11101	4
0	0	0	1	1	Saved	11110	4
0	0	0	0	0	Saved	11111	4

Fig. 11

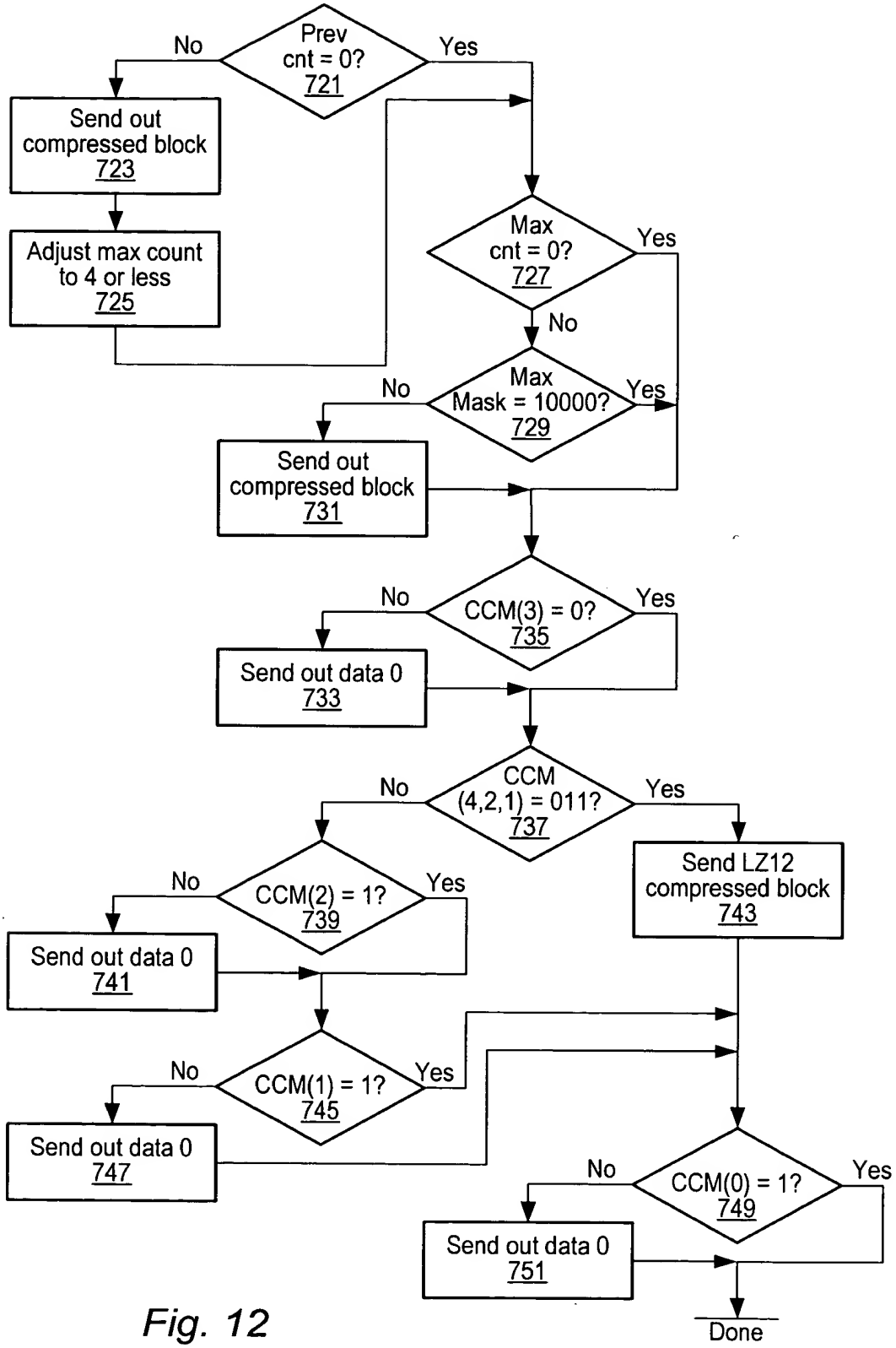


Fig. 12

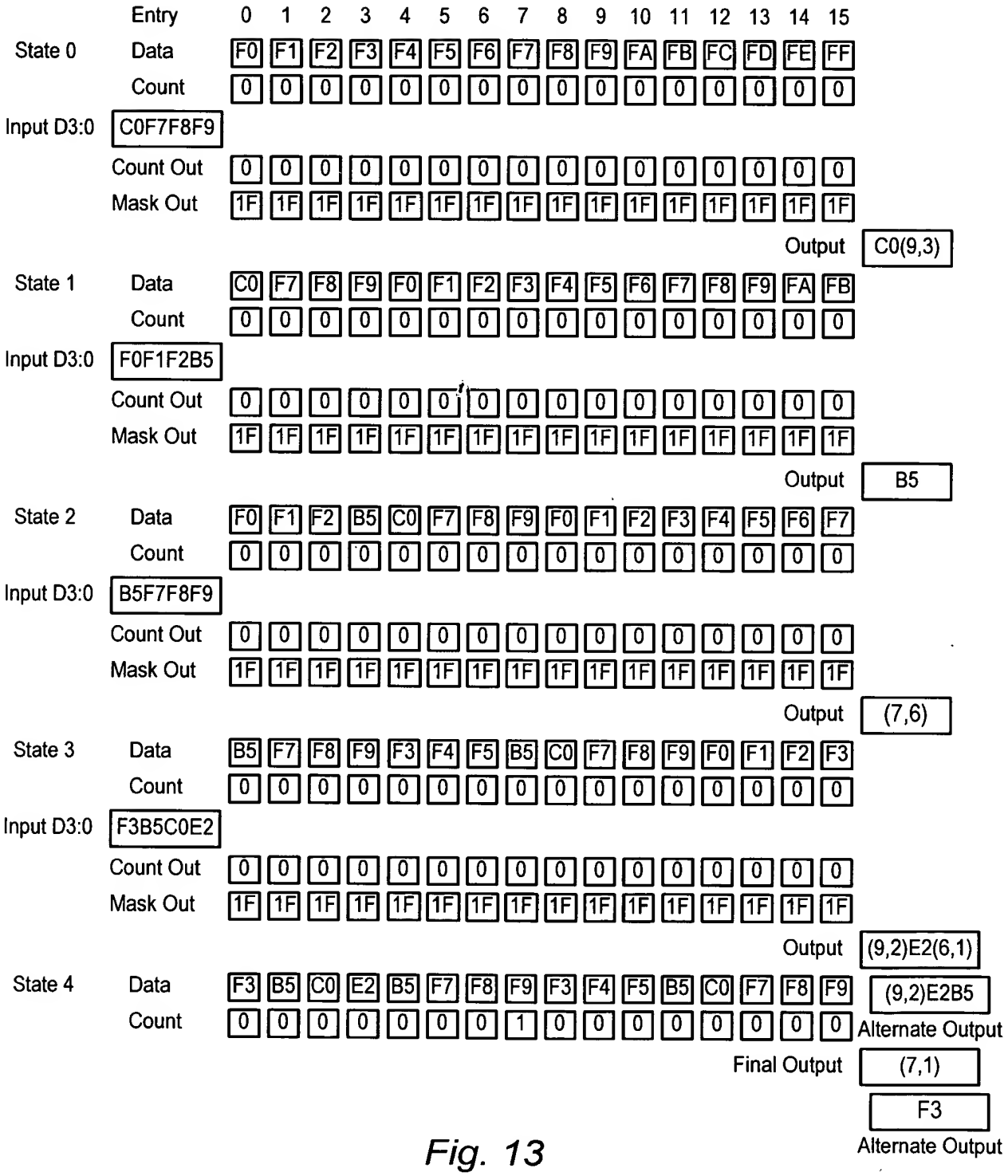


Fig. 13

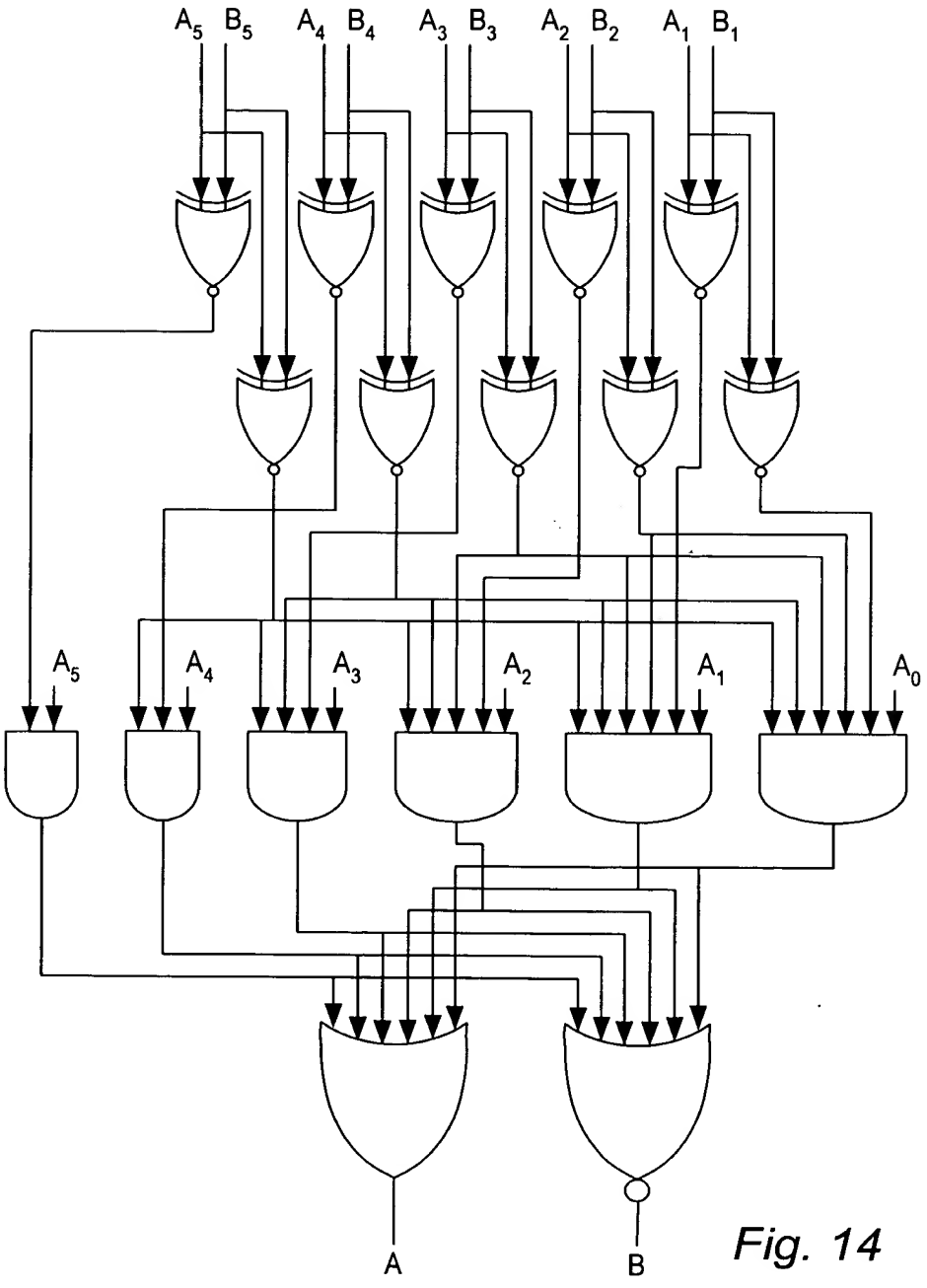


Fig. 14

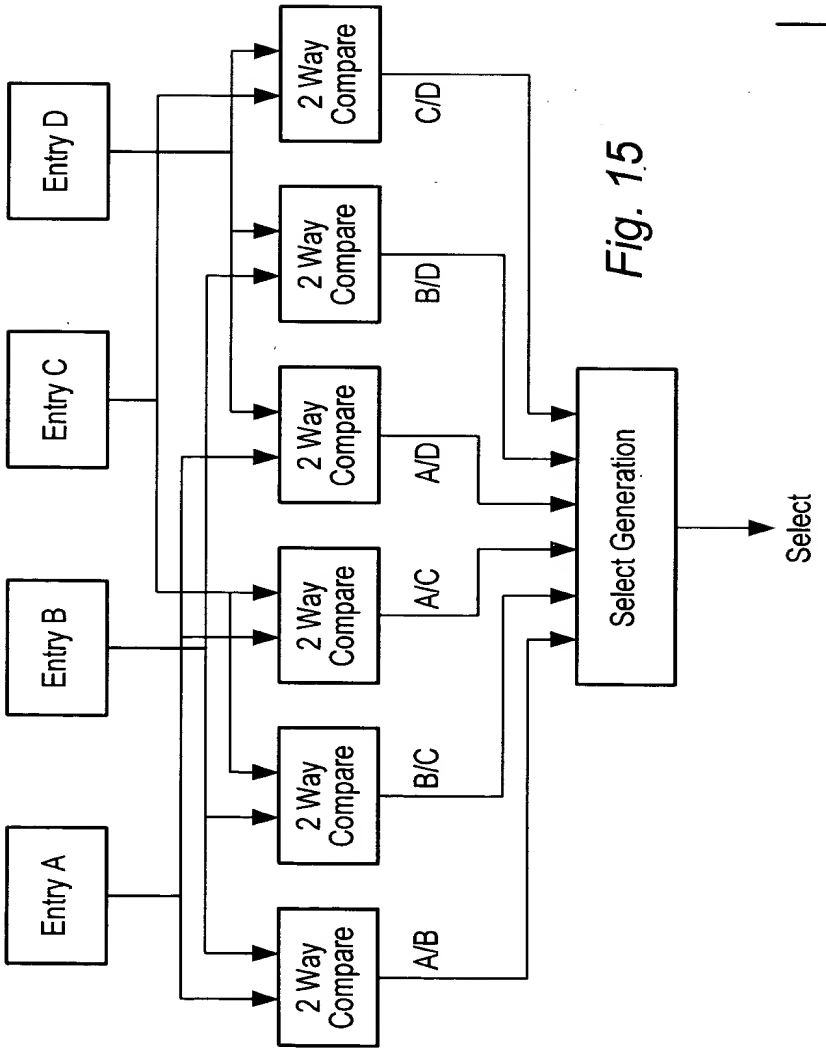


Fig. 15

A/B	B/C	C/D	D/A	A/C	B/D	Output
0	X	X	1	0	X	A
1	0	X	X	X	0	B
X	1	0	X	1	X	C
X	X	1	0	X	1	D

Fig. 16

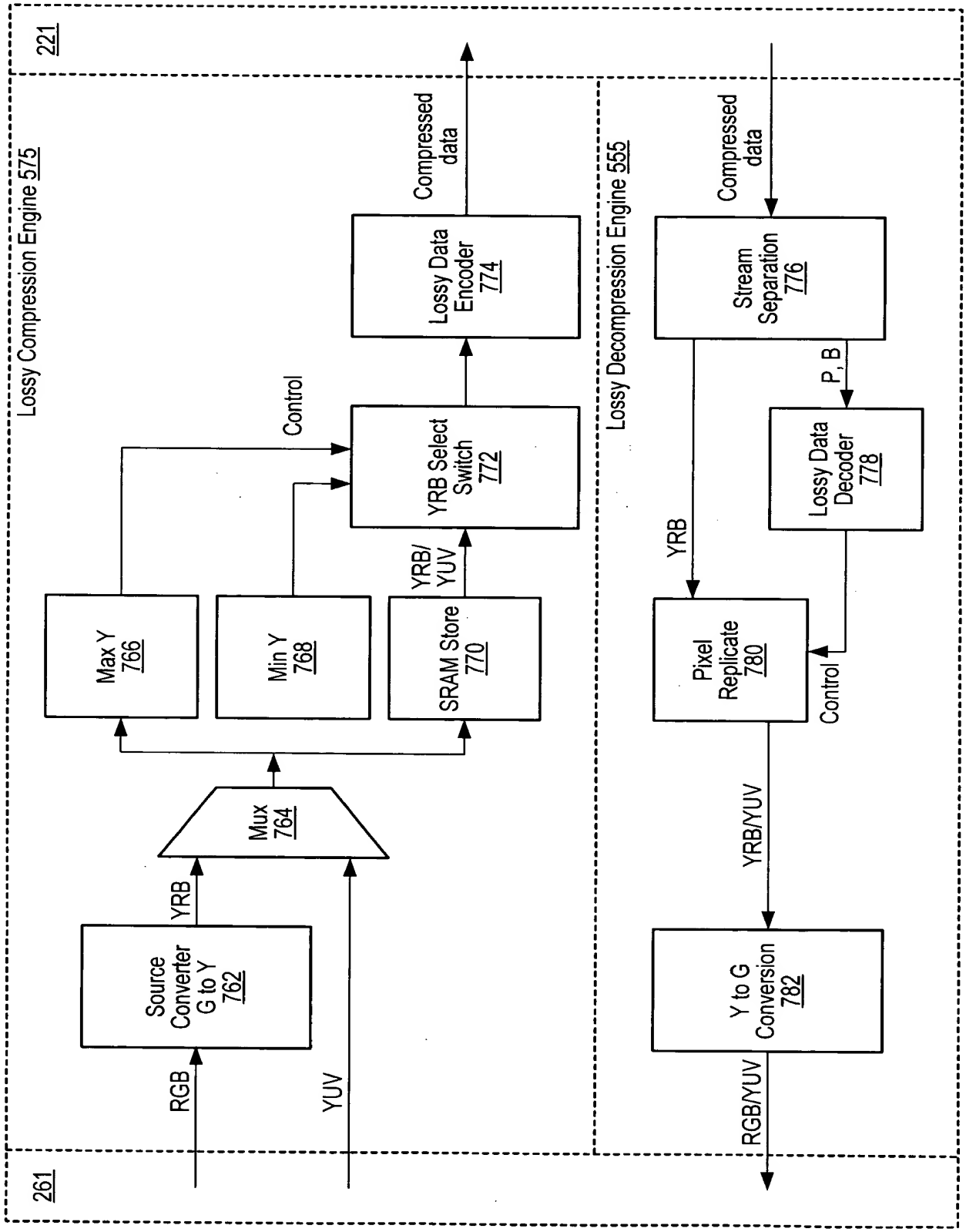


Fig. 17

Ymax = Ymin	1 color	Ymax	Ymax	Rmax	Bmax	11			3 Bytes
		6 bits	6 bits	5 bits	5 bits	2 bits			
Ymax != Ymin	2 colors	Ymax	Ymin	Rmax	Rmin	Bmax	Bmin	P bits	6 Bytes
		6 bits	6 bits	5 bits	5 bits	5 bits	5 bits	16 bits	
Ymax != Ymin	>2 colors	Ymin	Ymax	Rmax	Rmin	Bmax	Bmin	P bits	8 Bytes
		6 bits	6 bits	5 bits	5 bits	5 bits	5 bits	32 bits	

Fig. 18

Ymax = Ymin	Amax = Amin = 0x00	1 color	Ymax	Ymax	Rmax	Bmax	00					3 Bytes
			6 bits	6 bits	5 bits	5 bits	2 bits					
Ymax = Ymin	Amax = Amin = 0xFF	1 color	Ymax	Ymax	Rmax	Bmax	11					3 Bytes
			6 bits	6 bits	5 bits	5 bits	2 bits					
Ymax = Ymin	Amax = Amin != 00 or FF	1 color	Ymax	Ymax	Rmax	Bmax	01	Amax	Amin			4/5 Bytes
			6 bits	6 bits	5 bits	5 bits	2 bits	4/8 bits	4/8 bits			
Ymax = Ymin	Amax != Amin	1 color	Ymax	Ymax	Rmax	Bmax	01	Amax	Amin	P bits		6/7 Bytes
		2 Alphas	6 bits	6 bits	5 bits	5 bits	2 bits	4/8 bits	4/8 bits	16 bits		
Ymax = Ymin	Amax != Amin	1 color	Ymax	Ymax	Rmax	Bmax	10	Amax	Amin	P bits		8/9 Bytes
		>2 Alphas	6 bits	6 bits	5 bits	5 bits	2 bits	4/8 bits	4/8 bits	32 bits		
Ymax != Ymin	X	2 colors	Ymax	Ymin	Rmax	Rmin	Bmax	Bmin	Amax	Amin	P bits	7/8 Bytes
			6 bits	6 bits	5 bits	5 bits	5 bits	5 bits	4/8 bits	4/8 bits	16 bits	
Ymax != Ymin	X	>2 colors	Ymin	Ymax	Rmax	Rmin	Bmax	Bmin	Amax	Amin	P bits	9/10 Bytes
			6 bits	6 bits	5 bits	5 bits	5 bits	5 bits	4/8 bits	4/8 bits	32 bits	

Fig. 19

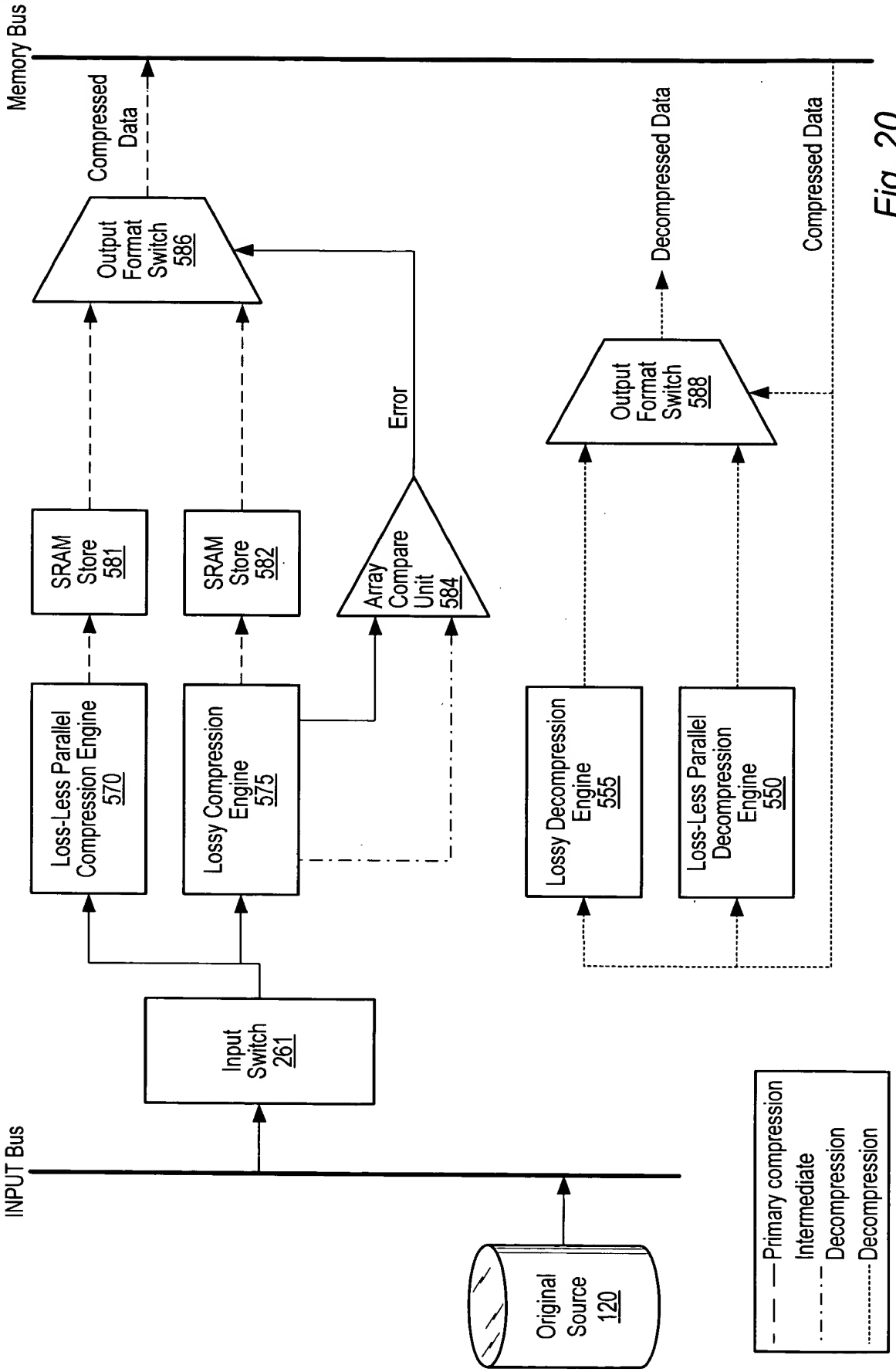


Fig. 20

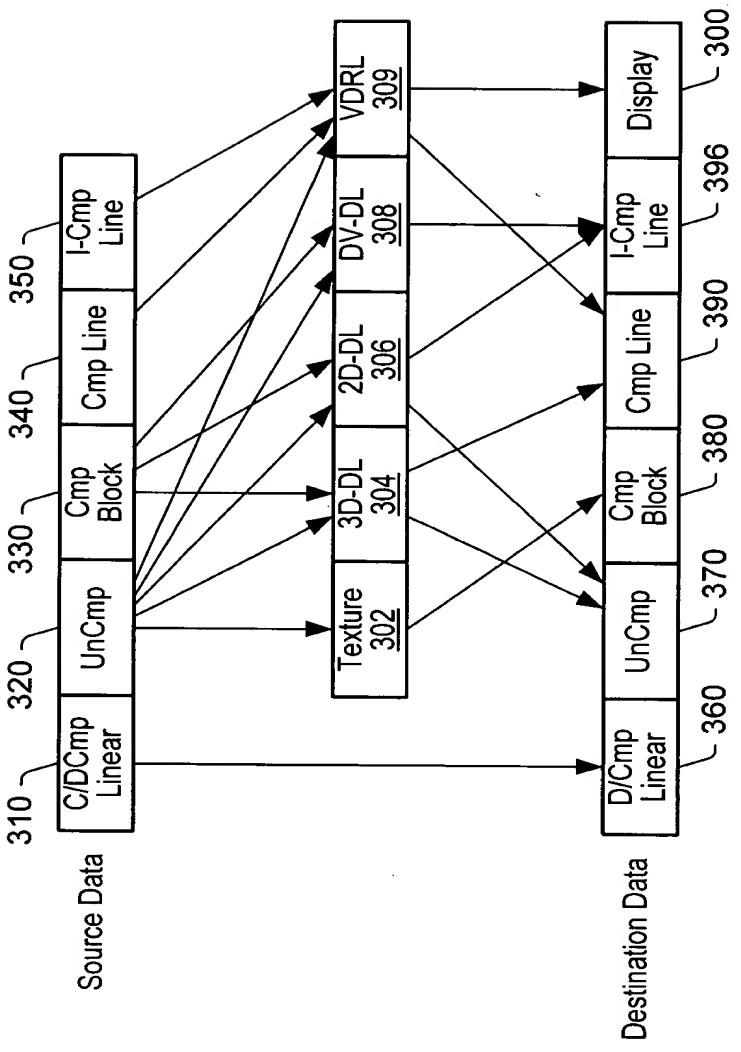


Fig. 21

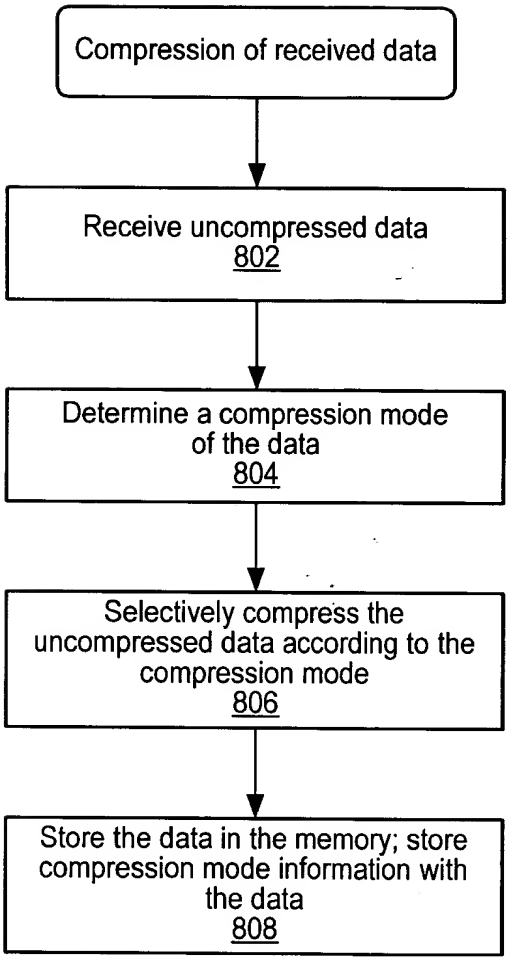


Fig. 22

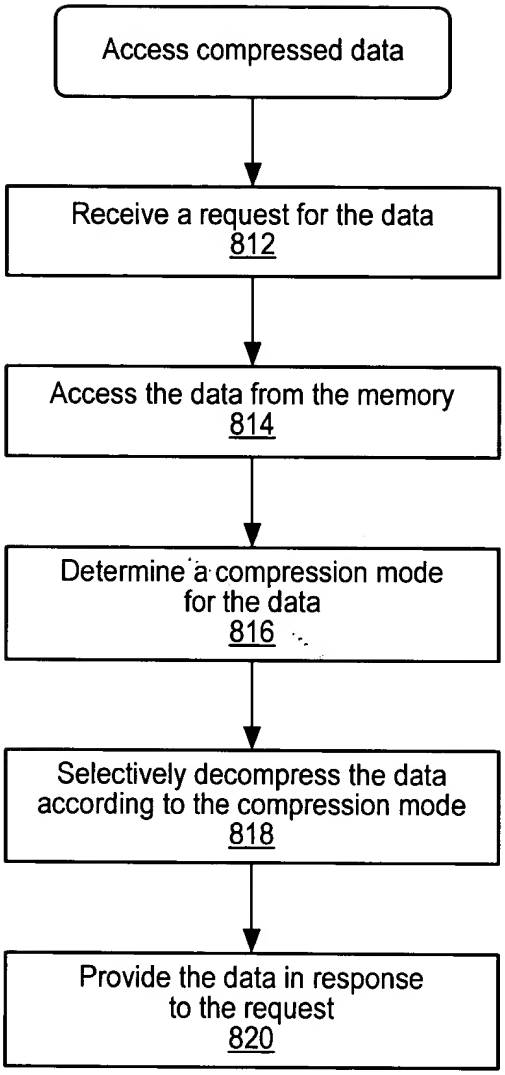


Fig. 23

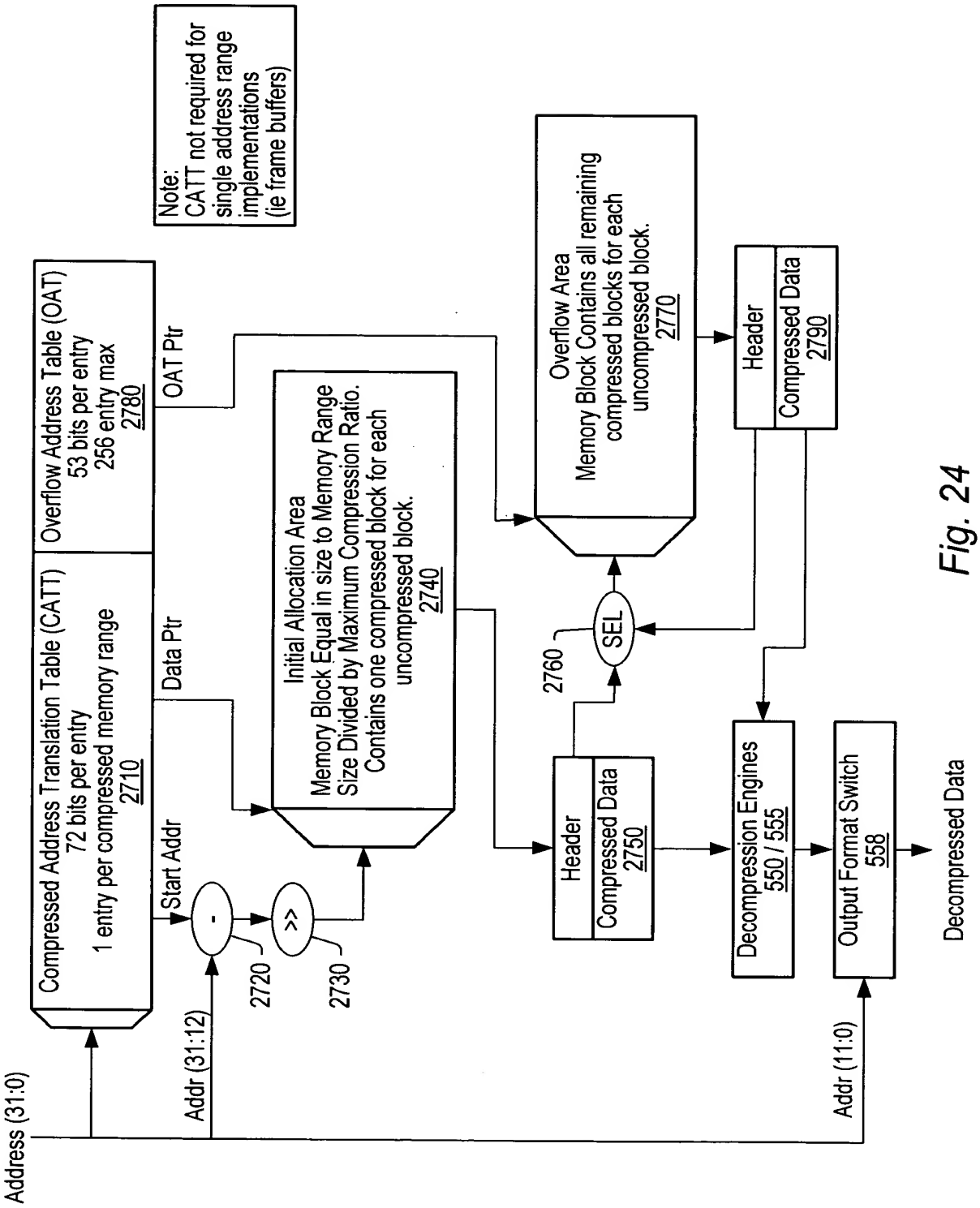

Address (31:0)
Addr (31:12)
Addr (11:0)
Compressed Address Translation Table (CATT)
72 bits per entry
1 entry per compressed memory range
2710
Overflow Address Table (OAT)
53 bits per entry
256 entry max
2780
Note:
CATT not required for single address range implementations (ie frame buffers)
Data Ptr
OAT Ptr
Start Addr
-
2720
>>
2730
Initial Allocation Area
Memory Block Equal in size to Memory Range Size Divided by Maximum Compression Ratio.
Contains one compressed block for each uncompressed block.
2740
Overflow Area
Memory Block Contains all remaining compressed blocks for each uncompressed block.
2770
Header
Compressed Data
2790
2760
SEL
Header
Compressed Data
2750
Decompression Engines
550 / 555
Output Format Switch
558
Decompressed Data

Fig. 24

Memory Allocation Fields

Compressed Address Translation Table (CATT)-128 Entry Design Limit				
Starting Addr	Ending Addr	Type	Data Ptr	OAT Ptr
20 bits	20 bits	4 bits	20 bits	8 bits
4GB Addressability		Compressed		
4K Boundry	4K Boundry	Blk Size	4K Boundry	4K Boundry

Overflow Address Table (OAT)-256 Entry Max			
Overflow Ptr	Next Block Ptr	Next OAT Ptr	Next OAT Valid
20 bits	24 bits	8 bits	1 bit
4 GB Addressability		Points to next entry	
4K Boundry		in this table	

Initial Header Description		
Value	# of bits	Meaning
0	1	Last Block/Unused
10 A (20 bits)	22	The next block is at offset A in the Overflow Area
11 IA(8+20 bits)	30	The next block is at offset A in the Overflow Area of OAT entry I

Overflow Header Description		
Value	# of bits	Meaning
00	2	Last Block/Unused
01	2	The next block follows physically after this one
10A (8 bits)	10	The next block is A blocks before this one (or after?)
110A (20 bits)	23	The next block is at offset A in the Overflow Area
111 IA (8+20 bits)	31	The next block is at offset A in the Overflow Area of OAT entry I

Fig. 25

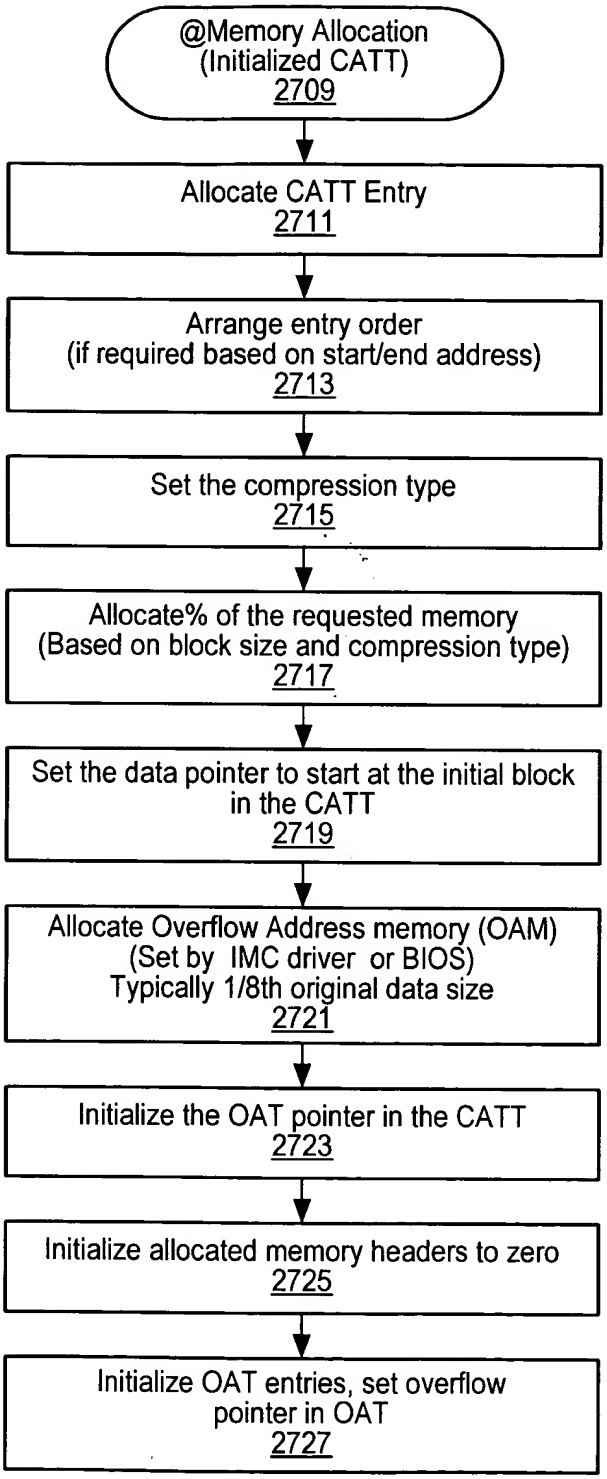


Fig. 26

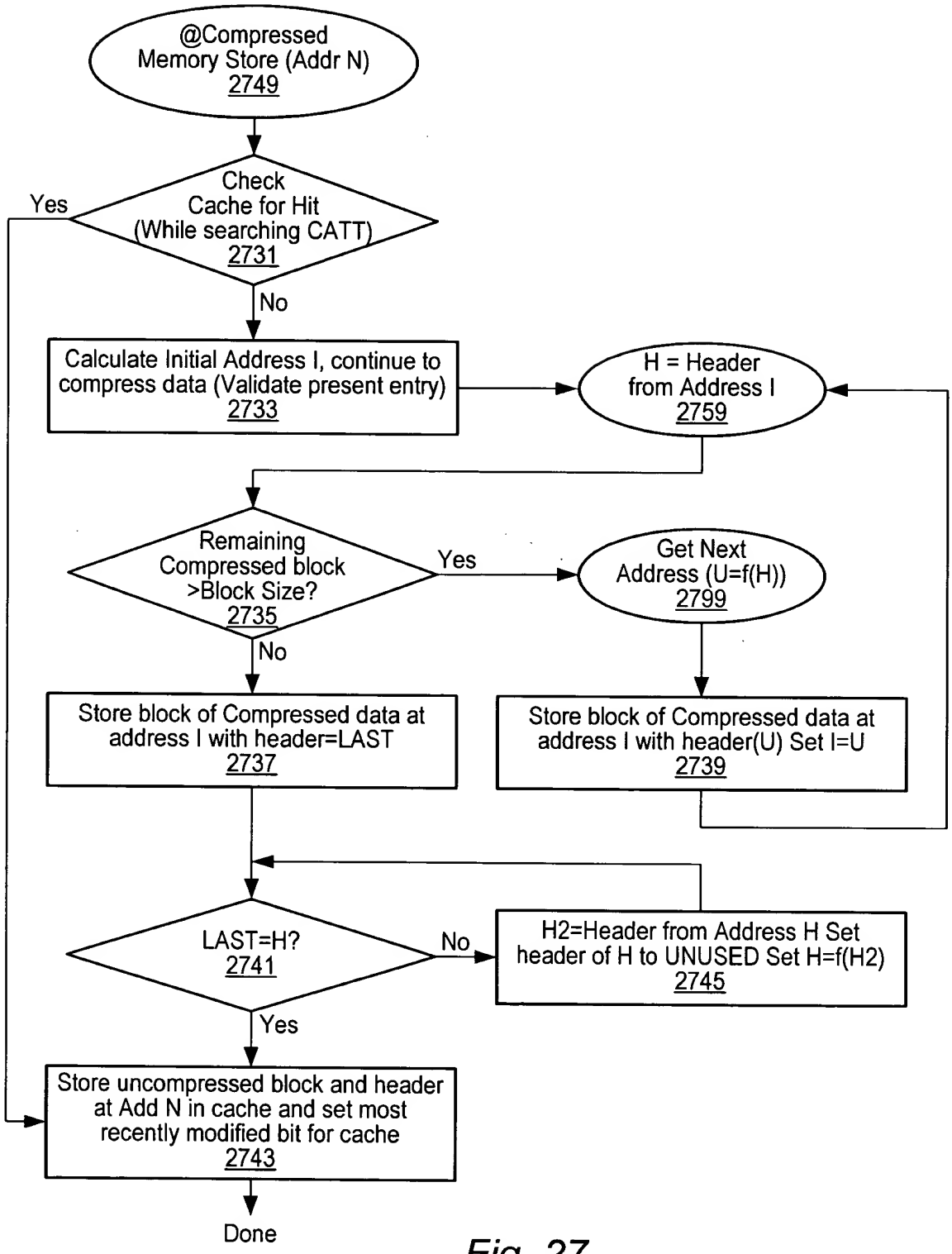


Fig. 27

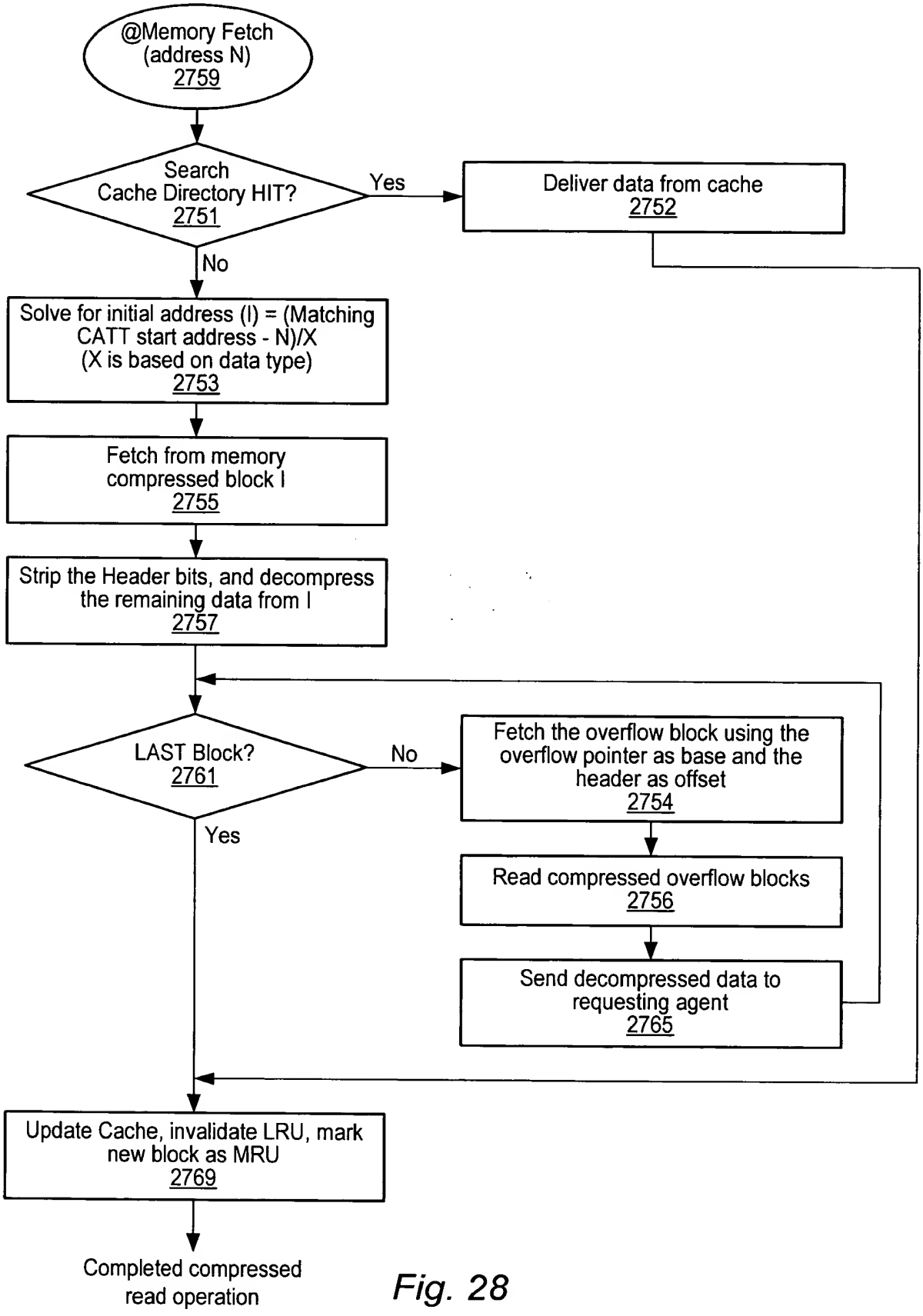


Fig. 28

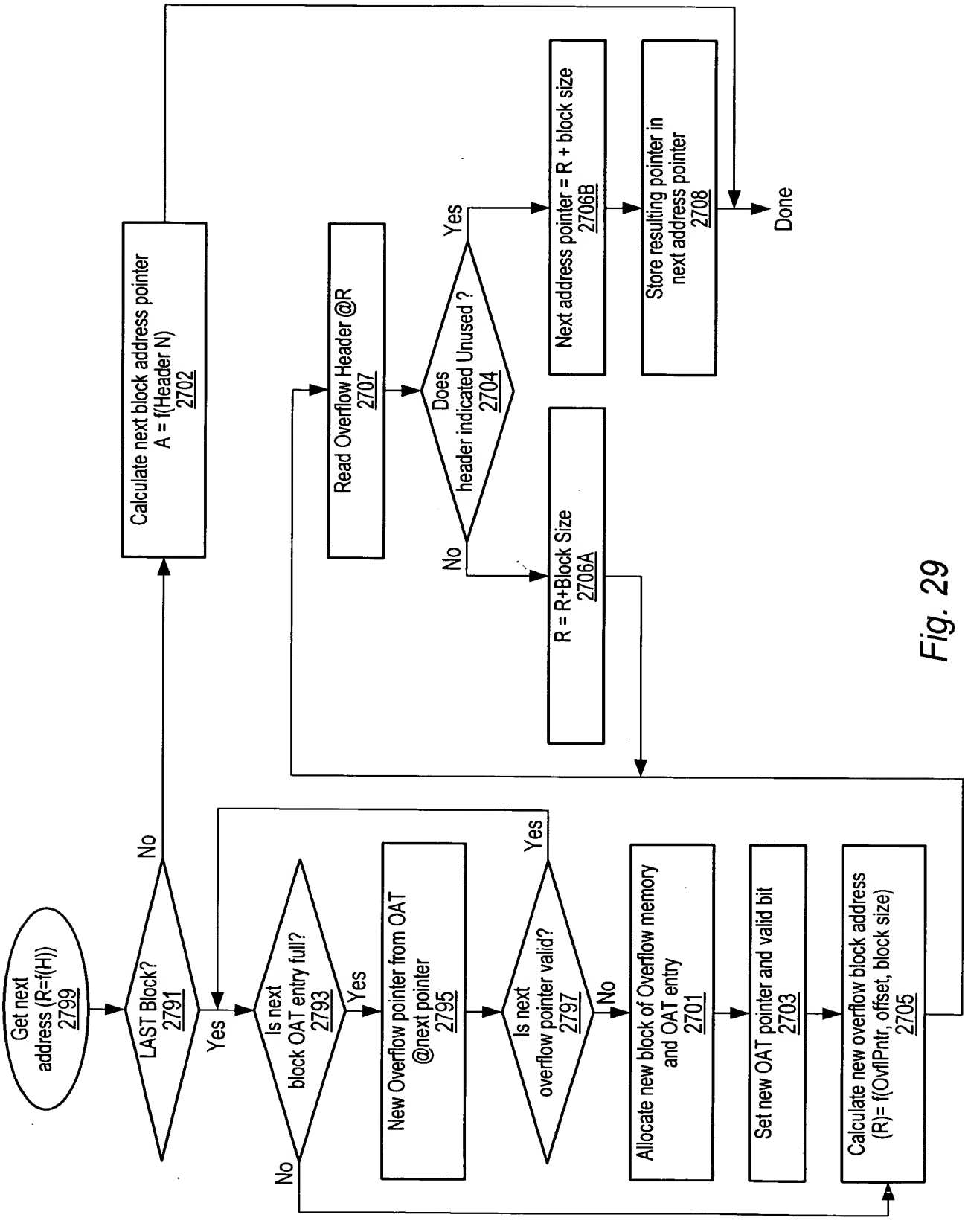
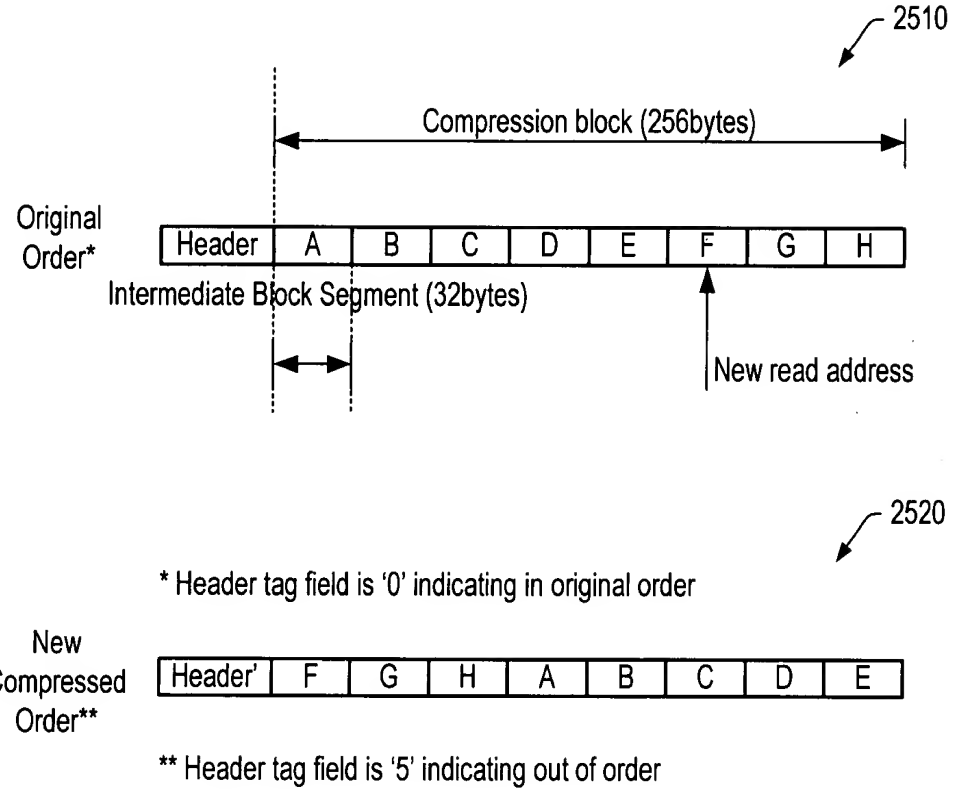


Fig. 29

Uncomp Block Bytes	Type	Initial Block Size Bytes	Overflow Block Size Bytes	Max Comp Ratio (X:1)	Initial Allocation	Header w/o OF	Header w/ OF Non-Frag	Header w/ OF Fragmented
4096	8	256	64	16	6%	0.0%	0.4%	4.1%
2048	7	128	64	16	6%	0.1%	0.5%	4.2%
1024	6	64	64	16	6%	0.2%	0.6%	4.3%
512	5	64	64	8	13%	0.2%	0.9%	4.3%
256	4	64	64	4	25%	0.2%	1.4%	4.3%
128	3	32	32	4	25%	0.4%	2.8%	8.8%
64	2	32	16	2	50%	0.4%	5.1%	13.6%
32	1	32	8	1	100%	0.4%	8.9%	11.5%

Fig. 30



2530

1) Read compressed block from memory
2) Decompress to L3 data cache
3) Store Position tag (@F) in table
4) Re - compress block out of order
5) Attach header with tag (@F)
6) Write compressed block back to memory

Fig. 31

Bytes Compressed	Flag	Index	Count	Data	Bits Used
0	0	-	-	8b	9
1	10	6b	-	-	8
2	1100	6b	-	-	10
3	1101	6b	-	-	10
4	1110	6b	-	-	10
5	1111000	6b	-	-	13
6	1111001	6b	-	-	13
7	1111010	6b	-	-	13
8	1111011	6b	-	-	13
9	1111100	6b	-	-	13
10	1111101	6b	-	-	13
11	1111110	6b	-	-	13
>11	1111111	6b	12b	-	25

Fig. 32

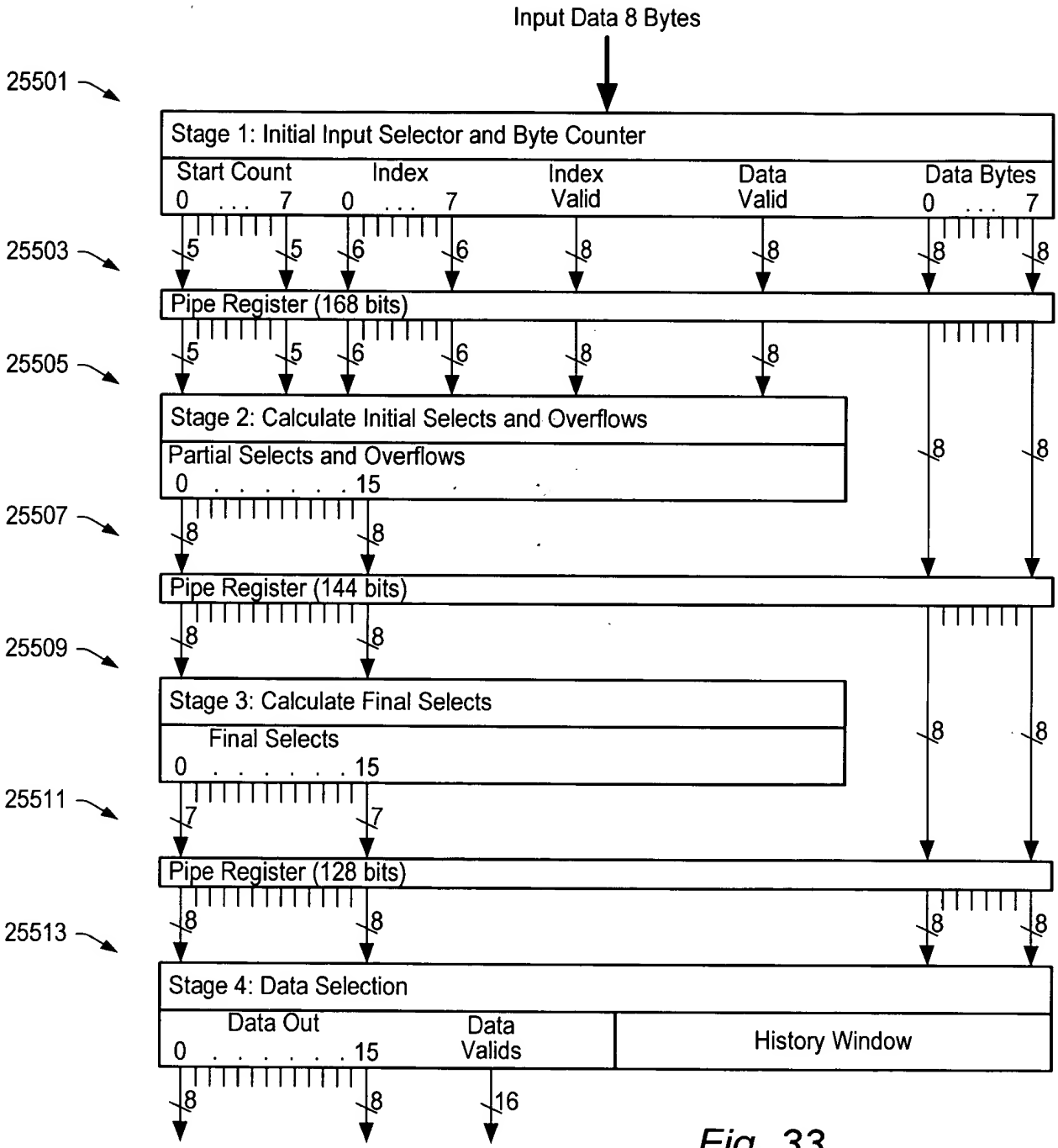


Fig. 33

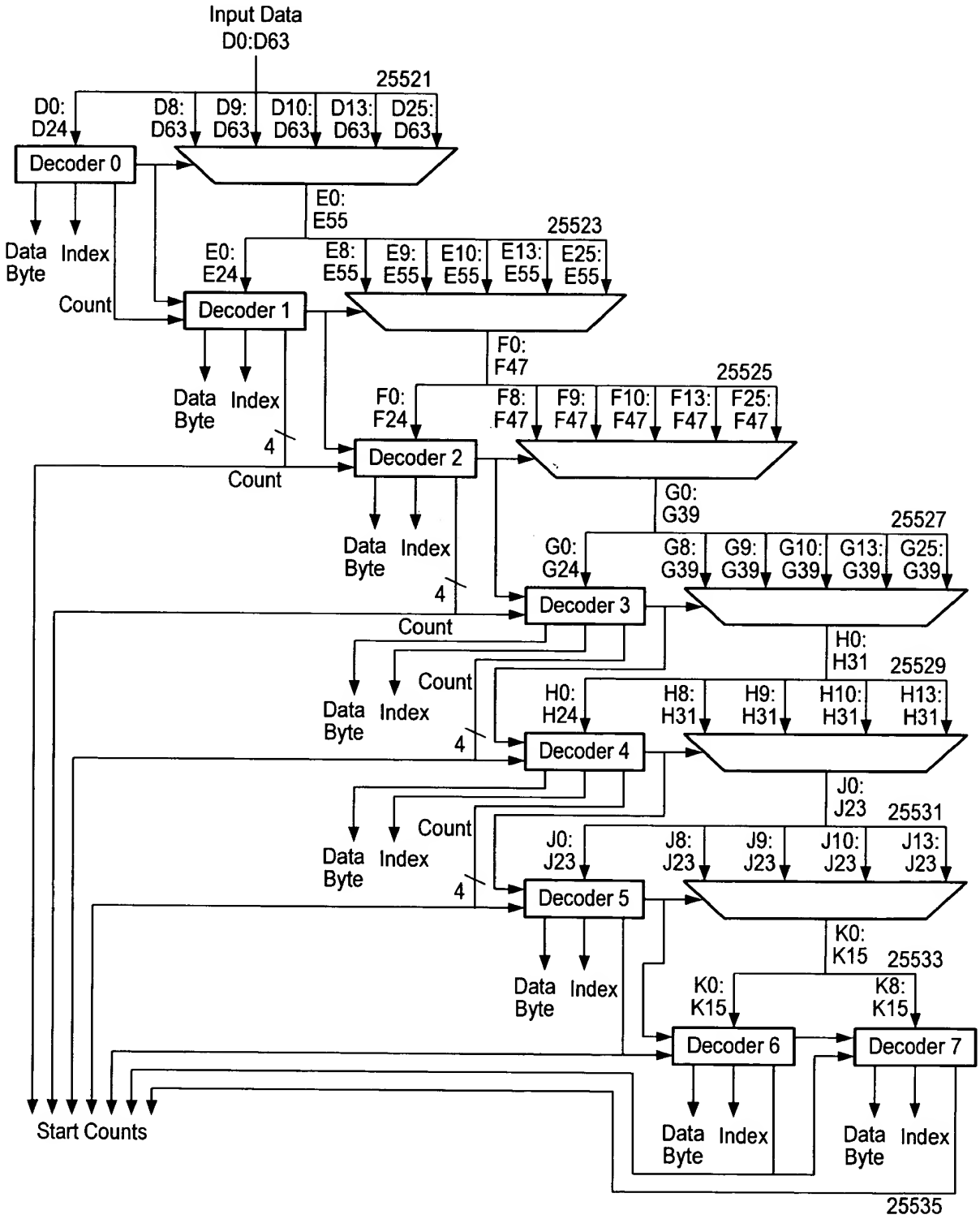


Fig. 34

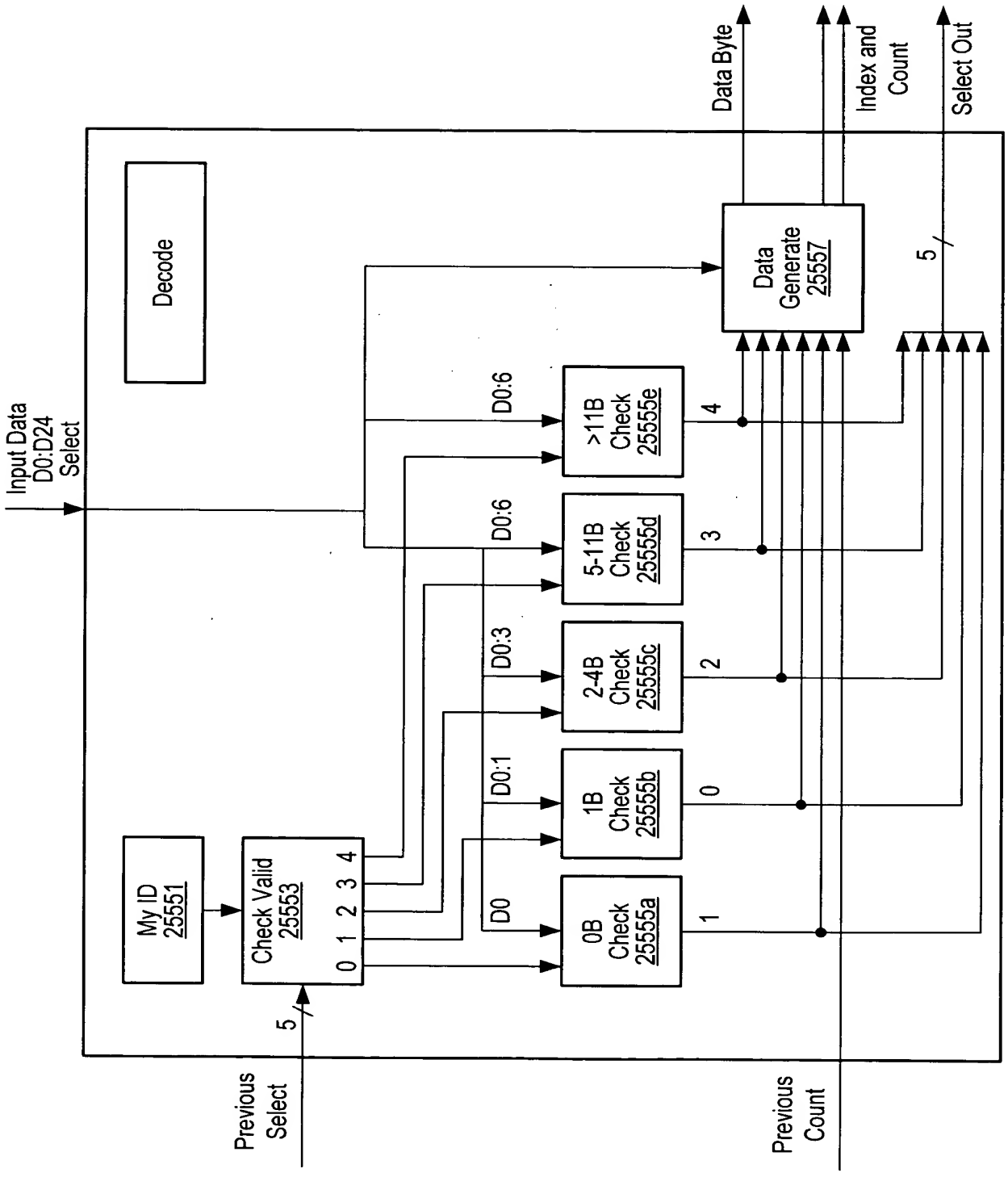


Fig. 35